



Engineering Newsletter

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS

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TV TECHNICAL TIPS NO. 31

—By CECIL S. BIDLACK, *NAEB TV Engineer*

This column is being written on the road in order to meet the deadline. It seems each month the deadline dates move closer together. Perhaps it is because it takes a while to get the *Newsletter* into print, and by the time it's out, copy for the next one is due.

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I have been honored by membership on Panel 4 (Propagation Data) of the TV Allocations Study Organization. TASO's function is limited to technical study, fact finding and investigation, and interpretation of technical data. This information will be made available to the FCC so the Commission may be able to determine the soundest approach to TV channel allocations. Panel 4 held its first meeting in Washington on March 13, with 20 of the 26 members present.

The standardization of field strength measurements is one of the first objectives under study by the panel. The Association of Maximum Service Telecasters now has two mobile field strength measuring units in operation. Two other units, a CBS unit and a Westinghouse unit, will soon be in the field. UHF transmission is also of primary concern; however, VHF measurements are also needed over different types of terrain. Please contact me if you have field strength data available.

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The Institute of Radio Engineers held its annual Convention in New York March 18-21. Fifty-five technical sessions were held during this period, ranging in topics from airborne radar to ultrasonics. The radio engineering show filled four floors of the New York Coliseum with 840 exhibitors taking part.

From an organization of radio engineers having its beginning in 1912, the IRE now has grown to 55,494 members. Due to this growth, 24 professional groups have been formed which cover specialized fields of interest. For instance, most radio and TV engineers will be found in the Professional Group on

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Broadcast Transmission Systems.

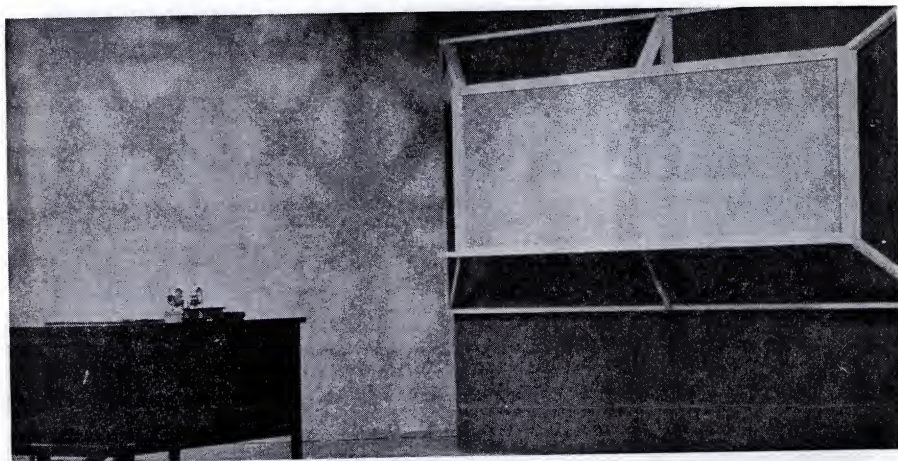
TV TECHNICAL TIPS NO. 32

I finally made it—to Minneapolis, that is—and the home of KUOM, NAEB President Burton Paulu, and KTCA. In addition to participating on a panel on the "Use of Closed Circuit TV by Schools" at the Central State Speech Association Conference April 5, I was able to take a look at the facilities of KUOM and KTCA.

KUOM occupies the 1st floor of Eddy Hall on the main campus of the University of Minnesota. Every square foot of this space is being utilized to provide offices, three studios (one of which also serves as a TV studio), a combination video control and recording room, and a master radio control room. They are presently converting their transmitter to remote control operation.

We believe many ETV stations could benefit by the procedures used by KUOM for checking and aging miniature tubes used in TV equipment. Upon receipt, KUOM checks each new receiving tube on a mutual conductance type checker. Those which give a sub-normal mutual conductance reading or show other defects are immediately returned to the jobber for replacement. In some instances as high as 20 per cent of the tubes received have been returned.

The tubes which pass this first test are then aged with rated voltages applied for 24 hours. A special aging device has been constructed which will age 24 tubes at a time. A plug and jack arrangement permits the application of appropriate voltages to the tube elements.



Pictured is the specially-designed chalk board used for a credit course at WUNC-TV, Chapel Hill, North Carolina. The chalk board is 4' x 8' and is built on a framework that extends it 15" from the wall. Due to the framework and a 5" chalk tray, the person using the board stands at least 2' from the wall, facilitating back and key lighting and improving camera angles.

After aging, the tubes are checked on a SECO Grid Circuit tube tester, which indicates control grid emission, grid to cathode shorts, cathode to heater shorts, and gaseous conditions. Another 5 to 10 per cent of the aged tubes fail to pass this test and are returned for replacement. The remaining tubes are then placed in stock to be used when the occasion demands.

Larry Brogger, KUOM chief engineer, has promised to furnish us details on the KUOM tube ager which we will duplicate and pass on to you. He believes this equipment will pay for itself in a year's time by locating sub-standard "new" tubes, to say nothing of the maintenance time saved by knowing that a tube is good before it is used in equipment.

Also as a result of the use of this procedure, he has become convinced that an occasional routine check of tubes in operating equipment is advantageous in maintaining the equipment in peak operating condition.

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Others may be interested in the photo on this page which shows how WUNC-TV mounts a blackboard for use on TV. Actually, the board isn't black; it's green. The framework was built by their staging facilities people and holds the board away from the backdrop. This feature makes possible the use of back light and also keeps the performer away from the wall so back light is effective. The supporting frame is not covered, as it adds a very pleasing pattern to the set.

I spent some time with Bert Holmberg, chief engineer of KTCA, the Twin City Area ETV Corporation station. The KTCA transmitter has been installed in the KUOM transmitter house, proof of performance tests have been completed, and they have had a test pattern on the air on Channel 2. Present plans call for programming to begin in September, 1957.

KTCA offices are located at present in a temporary building on the Agriculture campus of the University of Minnesota (which will also house live studio and film equipment). Work is about to be started on the installation of studio equipment.

Bert has had his physical activity severely slowed because he tore a tendon in his left heel in an attempt to get away from the KTCA tower when a bolt was dropped. Now that the cast has been removed and the crutches discarded, he hopes soon to be going full speed ahead.

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The NAEB Engineering Committee held a short meeting in Chicago Monday, April 8, prior to the NARTB Convention and Broadcast Engineering Conference. Six of the 10 committee members were present.

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Speaking of the NARTB Convention, I saw perhaps 20 engineers from educational radio and TV stations in attendance. No doubt there were others whom I didn't happen to meet or see. Total registration for the Convention was 2358, with 577 reg-

istered as engineers.

Some excellent papers were presented during the 3 full days devoted to the presentation of engineering papers. Eleven of these papers covered radio subjects, and 18 were devoted to TV engineering.

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I have no idea how many manufacturers were represented at the Equipment Exposition. Space in the Conrad Hilton Exhibition Hall was filled and there were a number of equipment representatives exhibiting on the 5th or 6th floors of the hotel. Program services, networks and others were also there providing something of interest to everyone in the broadcast industry.

As I saw it, the theme of the NARTB equipment exposition was "automation," with automatic devices being displayed for both radio and TV programming. These automatic devices were shown by Gates, Ampex, and General Electric. RCA also is working on an automatic program device.

Vidicon equipment was much in evidence. RCA displayed its new, broadcast quality vidicon camera. Kin-Tel, Sarkes-Tarzian, Dage and General Electric also were showing vidicon camera equipment for live and film use. In much of this equipment the film and live camera chassis is interchangeable.

In the field of video recording, Dage and Sarkes-Tarzian were showing 16mm kinescope recording equipment built to sell for less than \$8000. Ampex demonstrated its videotape recorder in the recently completed installation at the ABC-TV studios. Three of the prototype models have been installed, the first to incorporate the much desired feature of universal playback. As a result of non-interchangeability on earlier prototype models, CBS solved this problem by storing the recording head with the program tape in order to accomplish a 4 week delay on the Arthur Godfrey programs.

Tape continues to be the major problem of videotape recording, and tape manufacturers are working hard to solve tape problems. Some tapes now have a life of 200 passes—100 recordings and 100 playbacks. An hour's tape costs \$200, so when this life is achieved, cost is only \$2 per hour. However, cost per hour skyrockets when the tape only lasts 10 passes.

Another item of interest displayed was a device to reduce "burn in" on image orthicon cameras. It consists of a mechanism to oscillate the lens board of the TV camera, at the same time providing an electrical cancellation of the resulting vertical and horizontal motion.

It was demonstrated with an image orthicon with over 1000 hours service which had been discarded

because of burn in. The camera was left stationary on a test pattern and, due to the action of the device, showed no burn. With the device turned off a "burn in" was evident in 15 seconds. Visual Electronics manufactures this equipment which sells for \$2400.

It is impossible to mention all the equipment shown and manufacturers represented. They ranged from 10 watt TV translators to a new 50 kw GE AM transmitter with only 16 tubes, and included everything from antennas and audio equipment to microwave equipment, rear screen projectors, test equipment and a new monochrome AGC video amplifier.

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More details on Videotape operation will be found in the April 1, 1957, issue of *Broadcasting-Telecasting*, "VTR—Out of the Lab, onto the Firing Line." More details on the NARTB Convention are in the April 15, 1957 issue of the same publication.

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A great deal of interest has been aroused by papers presented at the recent IRE Convention in New York and the NARTB Broadcast Engineering Conference in Chicago, which covered TV test signals transmitted during the vertical blanking interval of the TV signal. These signals have been transmitted on an experimental basis by the networks.

The FCC on April 4, 1957, authorized all stations to transmit these signals without further specific authority as long as they do not interfere with synchronization, nor degrade the quality of the picture. Copies of this notice are being sent to all ETV operating stations through the cooperation of Cy Braum of JCET.

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Dr. George R. Town, executive director of the TV Allocations Study Organization, expressed hope at the NARTB convention that a major portion of the work of his organization will be completed within a year. TASO consists of 5 basic panels now at work, with 131 engineers from 67 organizations serving as members, alternates or observers.

One of the basic and immediate needs of the FCC is comprehensive and accurate engineering information on which to base TV allocations decisions. Panel 4, of which I am a member is at work in an attempt to secure new propagation data. The second meeting of this panel was held in Washington on April 17, and preliminary reports of the Committee 4.1 on Measurement of Service Fields and Committee 4.4 on New Factors were presented and discussed.

While many educational institutions are represented on TASO panels, only Robert C. Higgy of WOSU-AM-FM-TV represents an operating TV

station. It would be desirable to have more representation from ETV stations. If some of our chief engineers could serve as panel members, alternates or observers, I would appreciate hearing from you.

As a matter of information, TASO is sponsored by the Assn. of Maximum Service Telecasters, the Committee for Competitive TV, the JCET, the NARTB, and the Radio-Electronics-TV Mfrs. Assn. The 5 sponsoring organizations underwrite the administrative expenses of TASO, while the companies for which individual panel members work pay the expenses of operating the panels.

TV TECHNICAL TIPS NO. 33

New arrivals are always news! The NAEB Network is proudly displaying a new Ampex 300 Magnetic tape recorder which arrived May 6. This new equipment will permit a thorough overhaul of our present Ampex machines, in constant service since March, 1953 and gives us a feeling of security in that we now have a spare.

New monitoring loudspeakers, too, have been purchased which will provide better reproduction and permit a better check on the quality of our output. A complete revamping of the inter rack wiring and jack field is underway to provide more flexibility, and ease of testing and checking characteristics.

For those of you who are familiar with Headquarters geography, the "back room" (18c Gregory Hall) has been rearranged and Network Manager Bob Underwood has moved his office there. With the exception of Traffic Manager Peggy Enderby, the network is now a compact working unit in one room. We'd like to rearrange the "front" office to provide more privacy and increased efficiency, but so far no one has come up with a better floor plan.

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The 81st Semi-annual Convention of the Society of Motion Picture and TV Engineers was held in Washington, April 29 to May 3. Twenty-three of the 103 papers programmed were on TV subjects.

One of the highlights of this meeting was a visit to the Closed Circuit Color TV installation at the Walter Reed Army Medical Center, where its fine facilities were described and demonstrated. The speakers presented their talks over the TV system to those in attendance in two auditoriums, and were viewed in full color, projected on 4 x 6 foot screens.

An SMPTE Committee on Closed Circuit TV has been proposed, and 38 attended an explanatory meeting to discuss the proposal. A small "ad hoc" committee is to be appointed to further consider this proposal, which will review the discussion, draft a pro-

posed official scope of interest and an initial proposal of work to be undertaken.

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The 27th Institute for Education by Radio-TV was held in Columbus May 8-11. Due to the high interest in teaching by TV, the equipment exhibited was perhaps the largest display ever to be seen at this annual meeting. Beginning at the east end of the mezzanine of the Deshler-Hilton, Jerrold Electronics exhibited their distribution equipment, Dage displayed their two lines of vidicon equipment and kinescope recorder; Transvision, its classroom receiver; Sarkes-Tarzan had a complete studio control installation and kinescope recorder; RCA displayed its new vidicon broadcast type camera with field type control units; Zenith exhibited a hi-fi combination and a remotely controlled TV receiver.

A number of engineers were present to participate in the clinic on equipment for TV teaching.

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For those of you who are contemplating the installation of a 10 watt educational FM station, Marshall College has a 10-watt Gates No. B-F-E-10, MO-3276, with one MO-3304 set of tubes, one JR-072 crystal and oven, operating frequency 88.1 mc. Included in the package is 176 feet of new RG 18-U coaxial cable and one FM-11, MO 3429 Single Bay Broad Band Ring Type Antenna for two and one-half inch pipe with mounting clamp.

This equipment has never been used and cost new \$1,420.50. They offer the complete package for \$1000. If you are interested in purchasing this transmitter, write to Mr. Robert H. Maki, Gates Radio Company, Quincy, Illinois, since the transaction must be completed through them.

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RCA has developed an electronic orbiting device to prevent "burn-in" on image orthicon cameras. This modification kit is available for around \$800 and can be installed within present RCA cameras to materially increase the useful life of image orthicons.

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Anyone who has gone through the time-consuming process of installing coaxial connectors on RG-59/U cable should be interested in a time-saving connector developed by Entron, Inc., Box 287, Bladensburg, Md. It's a solderless connector which can be applied in a fraction of the time necessary to attach the conventional solder type connector. The solderless connectors are less expensive and the two necessary crimping tools sell at a very nominal price. Entron makes a complete line of solderless connectors, also, for RG-6/U, RG-8/U and RG-11/U cables as well as the tools necessary for their installation.

ELECTRONIC SYNC FOR DOUBLE SYSTEM KINESCOPE RECORDINGS

—JAMES LEONARD
Chief Engineer, WCET

At WCET we have used the space provided for preamplifiers in our Stancil-Hoffman S/5 Magnetic Film Recorder to incorporate an electronic sync cueing system. This is used in conjunction with our kinescope recorder to make double system television recordings. This device produces a sync cueing signal simultaneously on the tape and on the kinescope negative for use when the film and tape are edited to make the composite print.

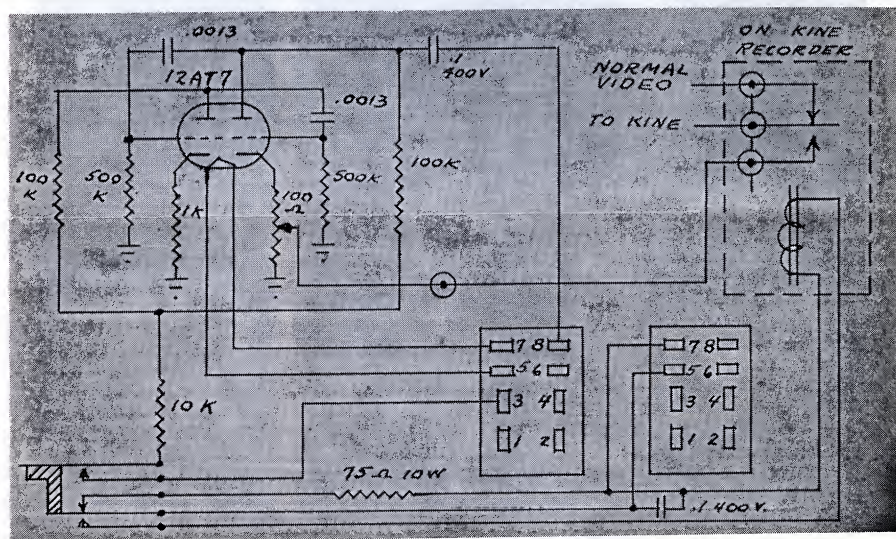
The sync unit is a multivibrator type oscillator which produces horizontal bars on the kine and sound on the tape. The wave-form is that of the usual multivibrator. No attempt was made to sync the rate (about 360 cycles) to the field rate since it was not believed necessary. Figure 1 shows the unit mounted on the shelf of the ARP4 amplifier occupying the space provided for two preamplifiers. The 3 x 4 x 6 inch chassis is a snug fit in this space. Video output and output control are shown on the back of the chassis as well as the location of the sync cue switch on the amplifier panel. This places the cue switch below and slightly to the left of the "record" button of the ARP-4 as shown on Figure 3. This makes for ease in cueing since once the recorders have been started the cue switch can be flipped up mo-

mentarily and the cueing is done.

The unit gets its two 12 volt d.c. supplies and also its B plus from the Jones sockets intended for the preamplifiers. The sound output feeds directly into the #1 volume control on the ARP4 and the level can be set for a convenient zero on the V.U. meter. The knob on the rear of the chassis sets the level for the video bars. The two Jones plugs mounted on the front of the chassis, plug into the preamp sockets. See Figure 2.

The low impedance video output from the cathode is fed via RG 59/U coax to the video input on the kinescope recorder in place of the normal video input, when the cue switch is thrown. The relay and the three coax connectors are mounted in a small shielded box near the associated coax connectors on our GPL recorder.

As is usually the case, after the first model of a new unit has been constructed, ways of improving on the original become evident. It is quite apparent that a unit the size of one preamp (one-half the size of our unit) could be built. This would permit the use of one preamplifier, if required. The heater of the 12AT7 would be substituted for the 75 ohm resistor in series with the relay. When the switch is operated the 12AT7 heater would be opened just long enough to operate the relay during the sync operation. The cathode would hold its heat during the cueing interval, and only one Jones plug and half the space would be required.



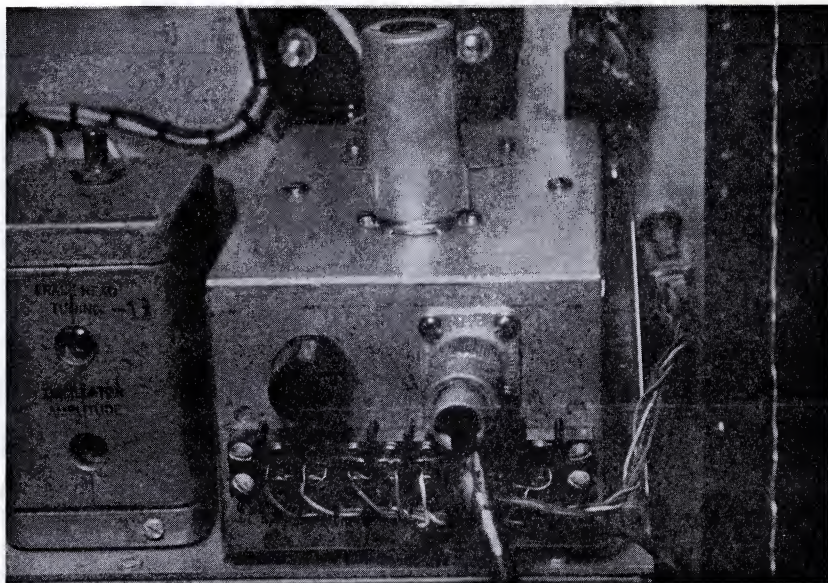


Figure 1

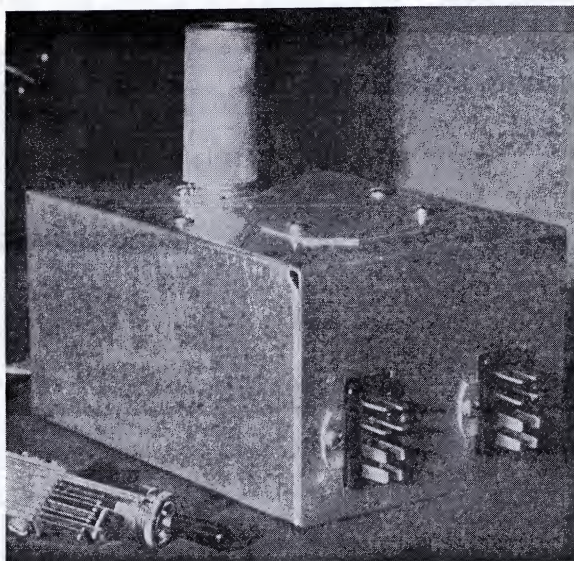


Figure 2



Figure 3

Scanned from the National Association of Educational Broadcasters Records
at the Wisconsin Historical Society as part of
"Unlocking the Airwaves: Revitalizing an Early Public and Educational Radio Collection."



A collaboration among the Maryland Institute for Technology in the Humanities,
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